Hotels Reservations Case Study

Business Problem Overview and Solution Approach

Business Problem

The cancellation of hotels rooms bookings and reservations causes a lot of disruptions in such a competitive space, which translates to loss of resources and efforts, and more importantly loss of potential revenue that could have been secured otherwise.

So we have a dataset of hotels reservations made in 2017 & 2018 , with various recorded features to help us identify patterns and trends in the data, and to create a Machine Learning model that can also help in predicting whether a reservation is likely to be cancelled or not.

Solution Approach

- Understand the request very carefully.

- Apply a generic feature understanding, by analyzing each feature and its relationship with other relevant features.

- Go through the recommended univariate analysis tasks and questions.

- Go through the recommended bivariate analysis tasks and questions.

- Give a very detailed showcase of the insights and findings resulting from the EDA.

- Train and compare a couple of machine learning models to see which would perform better for this use-case.

Repository Breakdown

- GitHub repository:

    https://github.com/RainOfAshes/hotels-booking-study

- Please refer to the README.md in the repo.

- notebooks/eda_0_generic_features_understanding.ipynb   has the generic EDA process.

- eda_1_univariate_bivariate_analyses.ipynb has the answers for the questions highlighted in the slides deck

- documents/ have the relevant documents

- reports/ EDA_report.pdf the report for the EDA

- reports/ models_report.pdf the report for the model training results

- plots_and_figs/ should include the plots and charts resulting from the EDA

Univariate EDA

I highly recommend checking out the Jupyter notebooks to have a deeper look on the analysis done and calculations.

Note: The EDA task `Explore strategies to effectively manage and accommodate the increased demand` will be moved to the end to avoid repetition

Section 1: Marketing Segments

Identify the percentage of bookings made online versus offline and highlight any trends or insights that can inform business strategies

Online Bookings

- **Market Share**: Constitutes approximately **64%** of all reservations, highlighting the dominance of online channels due to convenience and ease of access.

- **Average Price**: Exhibits a **higher average price per room**, suggesting guests are more willing to spend on room upgrades or additional services, facilitated by the ease of adding options during the online booking process.

- **Stay Duration**: Has a **slightly longer average stay** than Offline bookings but shorter than Corporate stays, indicating a tendency toward leisure or short trips.

- **Lead Time**: Features a **moderate lead time** as guests often plan leisure travel in advance. However, cancellations are highest in this segment (**around 36%**), reflecting the flexibility of online booking and cancellation options.

- **Seasonal Demand**: Bookings **peak during high-demand periods** like holidays or summer, suggesting a large share of leisure travelers.

- **Weekend Preference**: Shows a **slight preference for weekends**, aligning with leisure travel trends.

- **Insight**: To **reduce cancellations**, offering targeted reminders or loyalty incentives for confirmed bookings could be beneficial.

Offline Bookings

- **Market Share**: Accounts for **30%** of all reservations, appealing to local or last-minute guests who prefer in-person or phone-based bookings.

- **Average Price**: Generally has a **lower average price**, possibly reflecting higher price sensitivity or distinct handling methods like agency or walk-in rates.

- **Stay Duration**: Shows the **shortest average stay**, likely due to last-minute or local guests needing accommodation for a night or two.

- **Lead Time**: Tends to have the **shortest lead time**, dependent on immediate availability and competitive rates.

- **Cancellation Rate**: Has a **lower cancellation rate** compared to online bookings, possibly reflecting stronger commitment from guests booking in person or via phone.

- **Demand Stability**: Demonstrates a **more stable distribution throughout the year**, indicating a mix of local and business travelers with less seasonal fluctuation.

- **Weekend Preference**: Also shows a **slight preference for weekends**, likely driven by local leisure travelers.

- **Insight**: Offering **value-added packages with competitive pricing** could attract more Offline customers and encourage incremental spending.

Corporate Bookings

- **Market Share:** Represents **5%** of total reservations, providing stable occupancy, especially during off-peak seasons.

- **Average Price**: Shows **average pricing between Online and Offline rates**, indicating a need for competitive but stable pricing.

- **Stay Duration**: Tends to have the **longest average stay**, as business travelers often book for extended periods.

- **Lead Time**: Generally has the **longest lead time**, as companies plan well in advance for conferences or business trips.

- **Cancellation Rate**: Has a **moderate cancellation rate**, reflecting the business nature of reservations, which are confirmed in advance but may change based on business needs.

- **Demand Stability**: Provides **stability during off-peak seasons**, helping fill occupancy during quieter periods.

- **Weekday Preference**: Primarily occurs on **weekdays**, aligning with business traveler needs.

- **Insight**: This segment can benefit from **corporate agreements, loyalty discounts, and targeted offerings** to ensure price competitiveness and loyalty.

Market Segment Analysis

Percentage of Bookings by Top 3 Segments
- Corporate 5.8%
- Offline 29.5%
- Online 64.8%

Average Total Nights by Segment
Lead Time by Segment
Cancellation Rate by Segment
Avg Special Requests by Segment
Avg Weekend Nights by Segment
Avg Week Nights by Segment
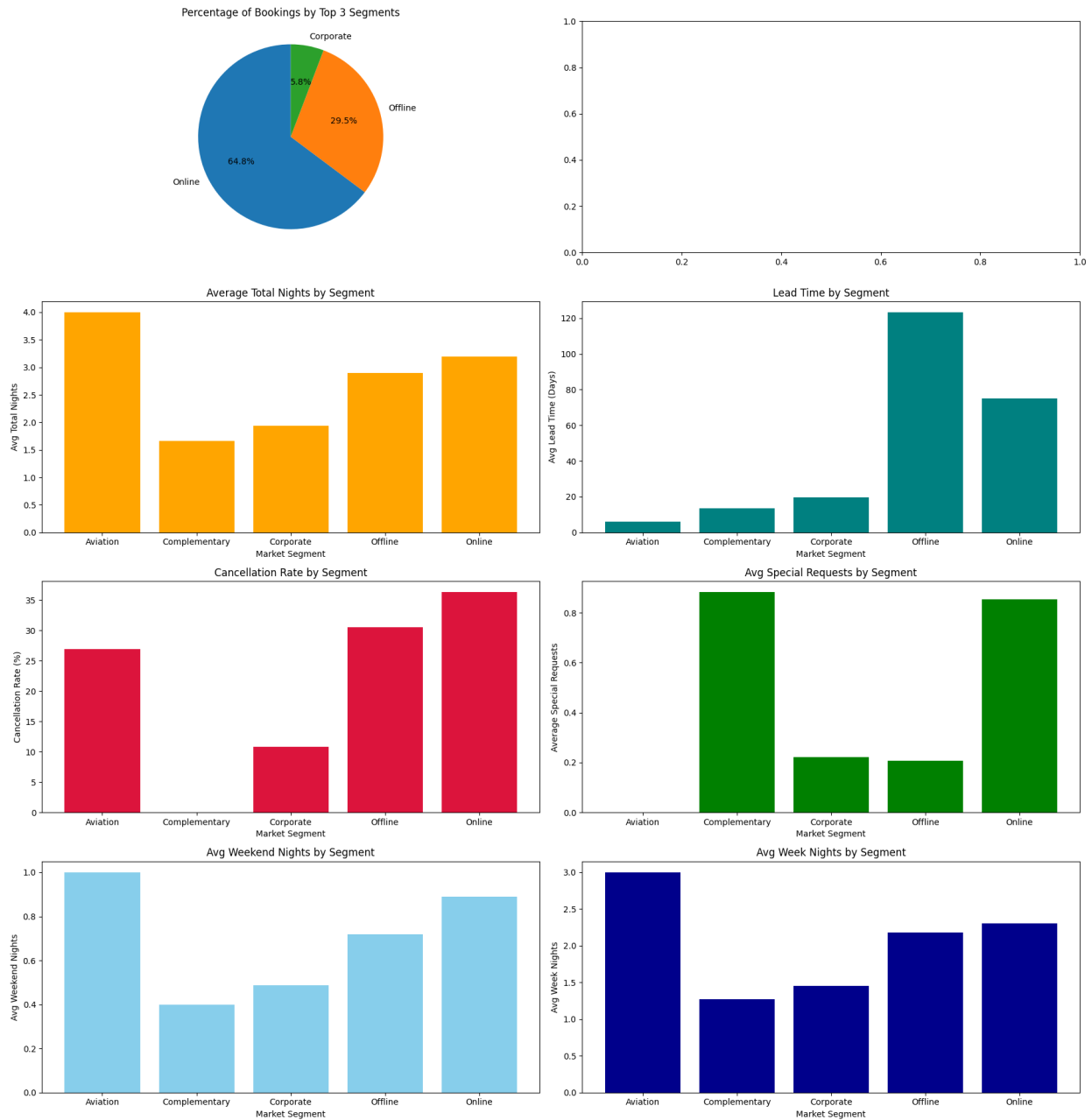
Section 2: Cancellation Trends

Analyze the percentage of bookings that are cancelled Are the cancellation trends a serious issue that needs to be looked at? If

so, what potential solutions can be implemented to address this problem?

Is cancellation a trend and a serious issue?

- Yes, The overall cancellation rate is approximately 32.8%, meaning nearly one-third of all bookings are canceled.

- This level of cancellations represents a substantial loss in potential revenue and highlights a need for intervention to secure more bookings.

Main cancellation trends:

Seasonality

- Cancellations peak between June and September, aligning with the high-demand summer season, with the highest rate reaching 45.6% in July.

- Conversely, December and January show significantly lower cancellation rates (between 3% and 13%), indicating a more stable booking pattern during the winter months.

Lead Time

- Canceled bookings have an average lead time of approximately 140 days, compared to just 58 days for non-canceled bookings.

- This indicates that bookings made further in advance are more prone to cancellation, likely due to changing plans.

Special Requests

- Non-canceled bookings exhibit a higher frequency of special requests, averaging 0.77 requests per booking, compared to 0.34 requests for canceled bookings.

- Guests with specific requests may be more committed to their bookings, indicating a potentially stronger intent to complete their stay.

Market Segment

- Online bookings have the highest cancellation rate at 36%, which may be due to the ease of booking and canceling online.

- Corporate and Offline segments have lower cancellation rates, suggesting greater stability in these channels, likely due to business travel commitments and in-person booking commitments.

Stay Duration:

- Cancellation rates increase with longer stays, both for weekday and weekend nights. This could reflect the higher cost and commitment associated with longer stays, leading guests to cancel if plans change.

Repeated Guests

- Non-repeated guests have a significantly higher cancellation rate (33.6%) compared to repeated guests (1.25%).

- This suggests that loyalty and familiarity with the brand correlate with lower cancellation rates.

Requiring a car parking spot:

- Guests who book a car parking spots have less than 10% cancellation rate.

Potential Solutions to Address High Cancellation Rates:

- Create a detection system that predicts bookings that are likely to be cancelled, and schedule follow-up calls or emails with the people who reserved accordingly.

- Track the cancellation dates, and when do they cancel prior to the arrival time, and potential add policies regarding cancellations for long lead times.

- Put a limit on the lead times and how early someone can book a room.

- Increase the market segments that are less likely to cancel, which are corporates and offliners (probably locals or people who wants a room on the spot), by making marketing campaigns that specifically target these segments

- Leverage Low-Cancellation Seasons Since December and January have low cancellation rates, promotions could encourage more bookings during this

period. Additionally, reducing or easing cancellation restrictions for this time could help drive higher occupancy.

- Promote Loyalty Programs:Given that repeated guests have far lower cancellation rates, building loyalty programs that incentivize frequent stays may reduce cancellations. Consider offering perks for direct bookings or loyalty-based discounts to encourage repeat business.

Comprehensive Analysis of Booking Cancellations
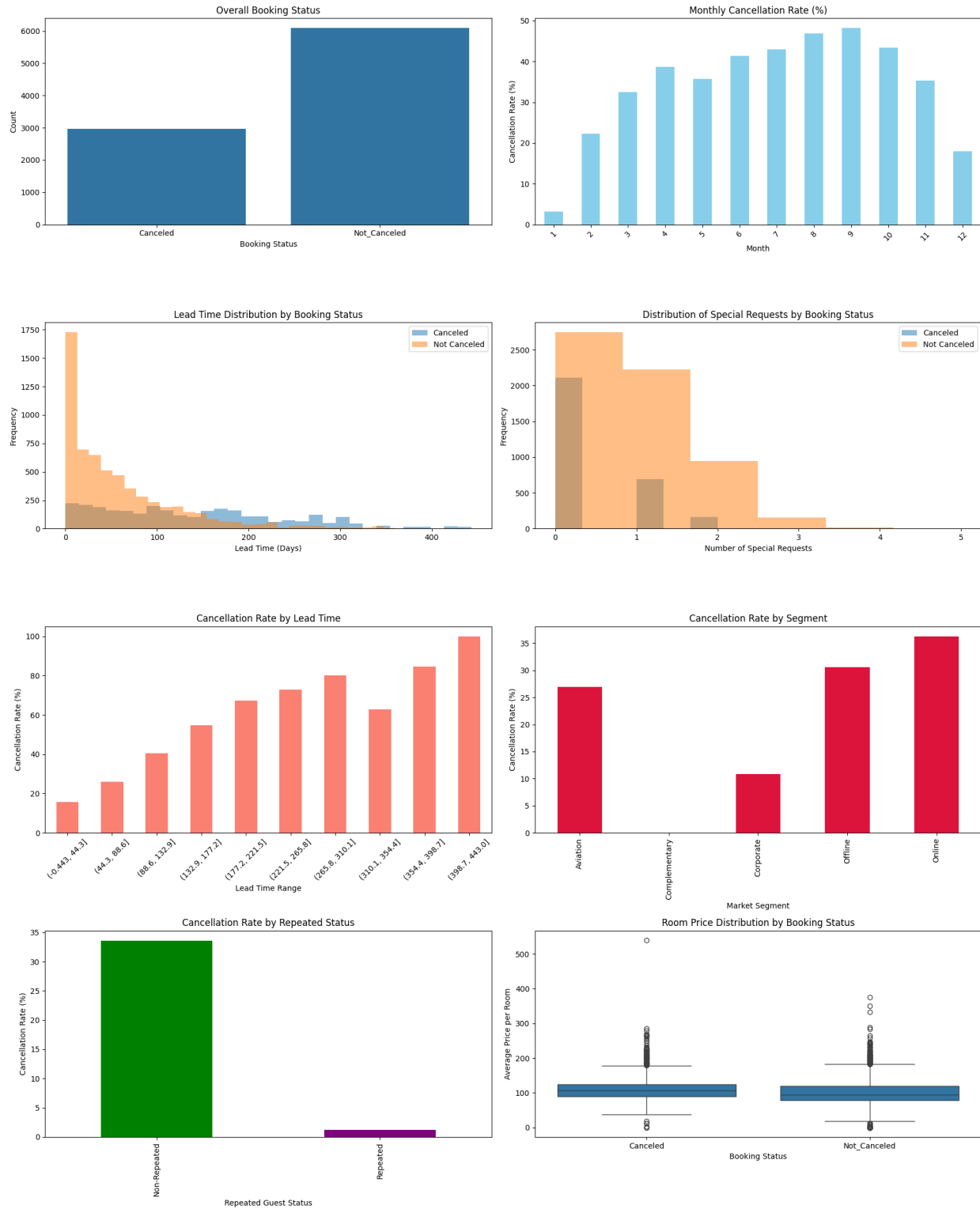
Section 3: Returning Guests

To what extent are customers returning to the hotel? Is this indication considered positive or negative, and what factors may be influencing this behavior? Furthermore, what strategies can be implemented to address and potentially improve this situation?

How many customers are returning to the hotel?

- Only 2.6% of customers are returning, highlighting a low retention rate. This low percentage indicates limited brand loyalty or familiarity among guests within the recorded data window.

- Note: Since the data spans only a year and a half, it may not capture long-term loyalty trends. A longer observation period would provide a more reliable measure of true customer loyalty.

Monthly trends

- Repeated guests tend to book more at the start and end of the year (especially in January), while bookings drop in mid-year months. This pattern may be driven by seasonal corporate needs or annual travel cycles, suggesting that returning guests may represent repeat business trips or routine leisure travel.

Market Segment Influence

- Repeated guests are primarily from the Corporate segment. This aligns with typical business travel patterns where clients may visit the same location periodically for work.

Lower Cancellations

- Repeated guests show a significantly lower cancellation rate (only 1.25%) compared to non-repeated guests (33.6%), indicating a stronger commitment or dependency on the hotel by returning customers.

Shorter Stays with Smaller Groups

- Repeated guests have fewer average nights and smaller party sizes than non-repeated guests, likely due to the corporate focus, with guests traveling alone or in small teams for shorter periods.

Lack of Family-Oriented and Leisure-Repeat Business

- Only 1.25% of repeated guests have children, indicating a gap in family-oriented or leisure-repeat business. The hotel may not be attracting families or casual visitors frequently enough to build loyalty in these segments.

How to improve the situation?

- Develop Loyalty Programs Targeted at Leisure and Online Customers

- Enhance Corporate Loyalty, Since Corporate guests are already the primary returning customer base, the hotel could strengthen this relationship with corporate loyalty programs, long-term corporate contracts, or business perks.

- Family and Group-Focused Packages

Analysis of Returning Guest Behavior and Metrics

Monthly Booking Patterns for Repeated Guests

Average Special Requests by Repeated Status

Cancellation Rate by Repeated Status

Average Total Guests by Repeated Status

Meal Preference for Repeated Guests

Percentage with Children by Repeated Status

Average Total Nights by Repeated Status

Correlation with Previous Reservations
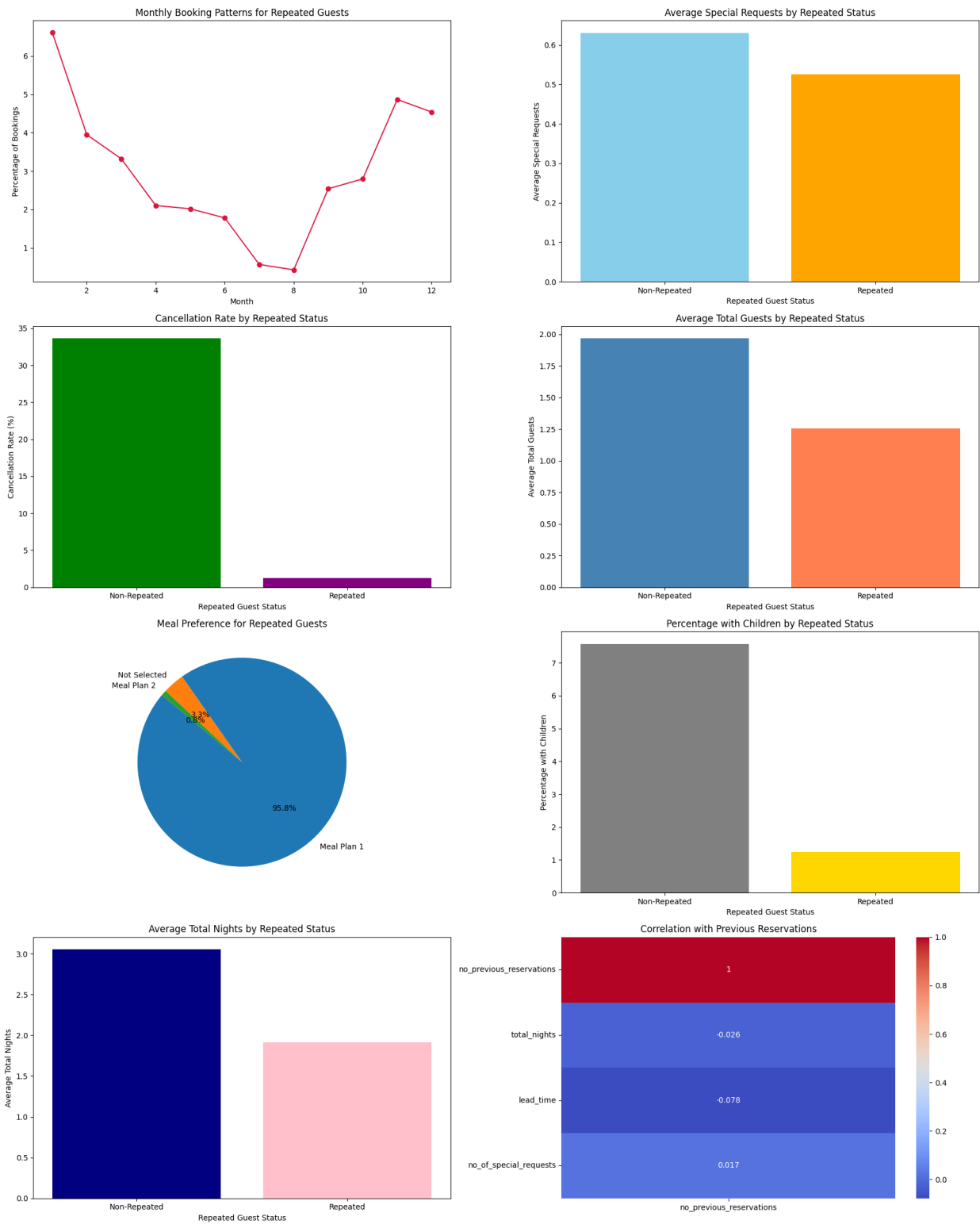
Section 4: Revenue Management

Explore how hotels can optimize their revenue management strategies considering the significant price variations observed across different market segments

Detailed Revenue Insights

Revenue Loss due to Cancellations:

- Approximately 35% of potential revenue is lost to cancellations, a substantial impact on overall revenue.

- Bookings with zero or one special request contribute the highest revenue but also incur the most significant losses. This group represents the core customer base, so efforts to retain these bookings could significantly improve revenue.

Impact of Special Requests:

- Bookings with higher levels of special requests correlate with lower revenue and fewer cancellations, suggesting that guests with specific preferences are more likely to follow through with their bookings.

- This indicates that guests requesting additional services are often committed, although they represent a smaller proportion of total revenue.

Influence of Children on Revenue:

- Bookings without children contribute significantly more to both revenue and cancellations than those with children. Revenue from child-free bookings is nearly ten times higher, indicating a key demographic that also presents a higher cancellation risk.

Seasonal Revenue Trends:

- October, September, and June show positive revenue differences, indicating these as high-performing months with substantial net revenue.

- July, November, and December have lower revenue differences, with July nearly breaking even. This pattern suggests seasonal adjustments may be needed to manage low-performing months more effectively.

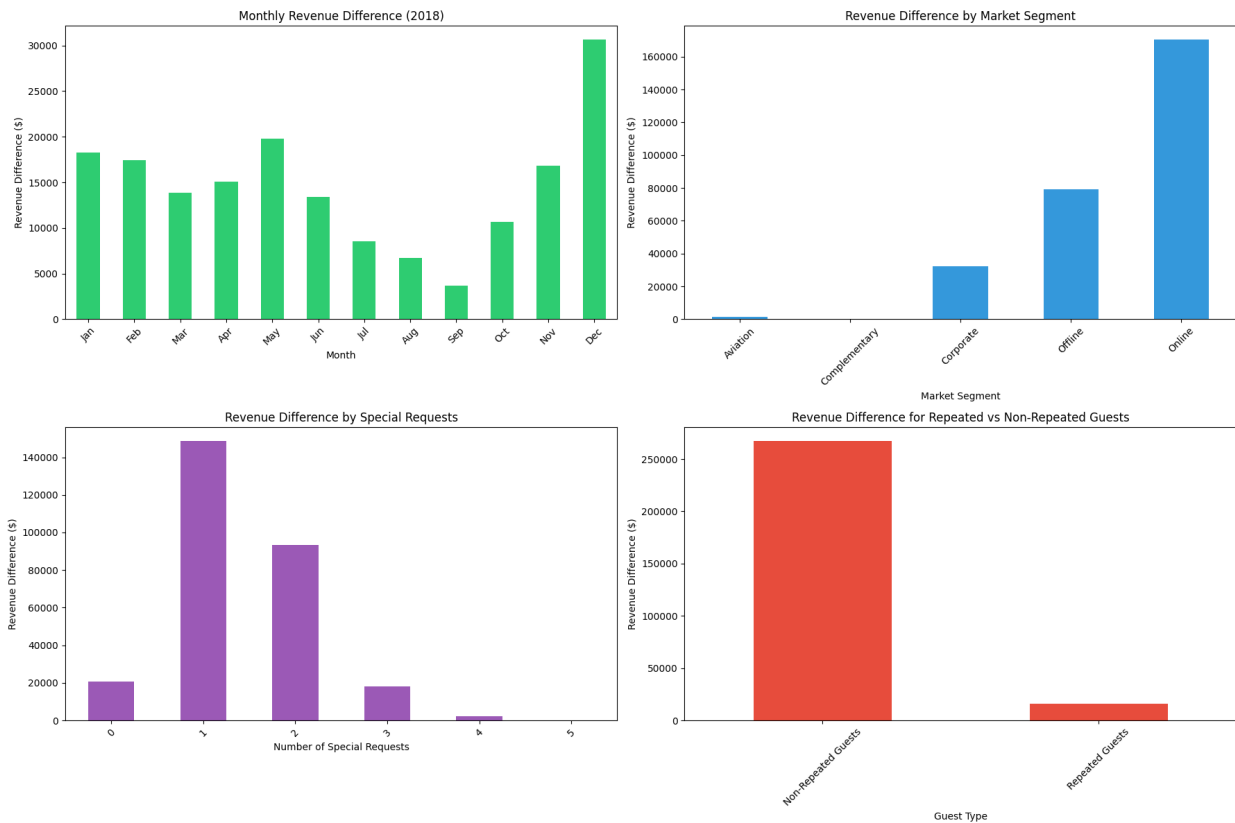## Returning Customers and Revenue Stability:

- Repeated guests contribute a smaller but more stable revenue with fewer cancellations. This loyal customer base provides a reliable, steady revenue stream and reinforces the importance of customer retention initiatives.

Market Segment & Revenue Insights

- The Online segment is the largest revenue generator but also incurs the highest cancellation-related losses. It's highly profitable but requires careful management to limit revenue erosion from cancellations.

- Corporate and Offline segments provide stable revenue with relatively lower losses, highlighting the reliability and lower cancellation risk of these segments. These guests likely have specific business needs, which makes them less likely to cancel.

Revenue Strategy Optimization Suggestions

- Targeted Retention for High-Revenue Online Booking

- Enhance Booking Experience for High-Special-Request Guests

- Corporate Agreements and Long-Term Contracts

- Flexible and Weekday-Focused Packages for Offline Bookings

- Price Adjustments for Low-Performing Months

- Rewarding Repeat Guests

- Peak Season Optimization: During high-performing months (e.g., June, September, October), maximize revenue by offering premium pricing for popular dates while incentivizing longer stays or add-ons.

Monthly Revenue Difference (2018)

Revenue Difference by Market Segment

Revenue Difference by Special Requests

Revenue Difference for Repeated vs Non-Repeated Guests

Bivariate EDA

Section 1: Cancellation Mitigation

Explore strategies to mitigate cancellations and consider how these insights can be leveraged to reduce cancellations across different booking channels

Data Informed Mitigation Strategies

Note: Since this was heavily analyzed in Univariate Analysis-Section 3, please refer to the charts and plots there for an overview. Will not regenerate them to avoid extensive repetition.

- Create a detection system that predicts bookings that are likely to be cancelled, and schedule follow-up calls or emails with the people who reserved accordingly.

- Identify frequent cancellers in the Online segment and offer them special discounts or add-ons to increase their commitment. These efforts can reduce cancellations among one-time guests and potentially convert them to repeat customers.

- Track the cancellation dates, and when do they cancel prior to the arrival time, and potential add policies regarding cancellations for long lead times.

- Put a limit on the lead times and how early someone can book a room, a year ahead maximum.

- Promote Loyalty Programs: Given that repeated guests have far lower cancellation rates, building loyalty programs that incentivize frequent stays may reduce cancellations.

- Instead of fully cancelling a reservation, offer rescheduling options.

- For guests who initially book longer stays, offer incentives for booking shorter stays with an option to extend during their stay. This may reduce the likelihood of cancellations while allowing flexibility for longer visits.

- For Corporate clients, offer contracted rates, dedicated booking portals, and corporate discounts to incentivize consistent bookings. Establishing long-term partnerships with businesses ensures stable revenue and fills occupancy during off-peak periods.

- Implement dynamic pricing for high-cancellation months, with discounts and promotions tailored to these periods. Special packages for families, extended stays, or last-minute deals can boost occupancy in traditionally slower months.

Section 2: Special Requests

Examine the influence of special requests on booking cancellations and devise effective strategies to mitigate

cancellation rates when customers make such requests¶

Special Requests Inclusion Impact

- Lower Cancellation Rates with Special Requests: Bookings with special requests exhibit a notably lower cancellation rate (around 20%) compared to those without requests, where cancellations reach 43%. This suggests that guests who make special requests may feel more invested in their booking.

- Increased Commitment Among Higher Request Counts: The analysis showed that as the number of requests increases, cancellation rates tend to decrease. Guests with multiple requests are likely planning longer stays or have specific expectations, making them more committed to following through with their booking.

- Frequent Guests and Special Requests: There is a positive correlation between the number of special requests and the count of previous reservations. Frequent guests are familiar with the hotel and may be more comfortable customizing their experience, which also corresponds with lower cancellation rates.

- Larger Groups and Families: Guests with larger groups or children often make more special requests, likely because they need tailored accommodations. This demographic is also associated with fewer cancellations, indicating that these guests have more concrete plans and specific needs.

- Higher Room Rates and Special Requests: Higher room rates are associated with more special requests. Premium-paying guests expect personalized services, which could contribute to their commitment and lower likelihood of cancellation.

- Car Parking and Extended Stays: Guests requesting car parking spaces are also likely to make multiple special requests, as are those booking longer stays. This suggests that these guests may have more logistical needs or plan to stay for an extended period, reinforcing their commitment.

Special Requests Cancellation Mitigation

Note: You can apply the previously mentioned points for mitigating cancellation in general.

- Data-Driven Personalization: Regularly review trends in cancellations and special requests to adjust offerings based on guest profiles. For instance, if guests with certain requests (like room upgrades) show lower cancellation rates, highlight this option more prominently on the booking page.

- Personalized Communication for High-Request Bookings: A pre-arrival message confirming special requests and offering additional services helps guests feel valued and encourages commitment. Highlighting the arrangements made for their requests reinforces that the booking is tailored to their needs, reducing the likelihood of cancellations.

- Incentivize Non-Cancelable Bookings with Special Requests: For guests with higher request counts, consider offering small discounts or perks (e.g., complimentary breakfast or room upgrades) for non-cancelable bookings. This encourages committed guests to finalize their plans early.

- Flexible Cancellation with Add-On Requests: For bookings that include special requests, offer flexible cancellation options up to a certain date but require commitment closer to the booking period. This allows guests to confirm their needs without pressure while giving the hotel a better likelihood of retaining these bookings.

Analysis of Special Requests and Related Metrics

Special Requests and Cancellation Analysis
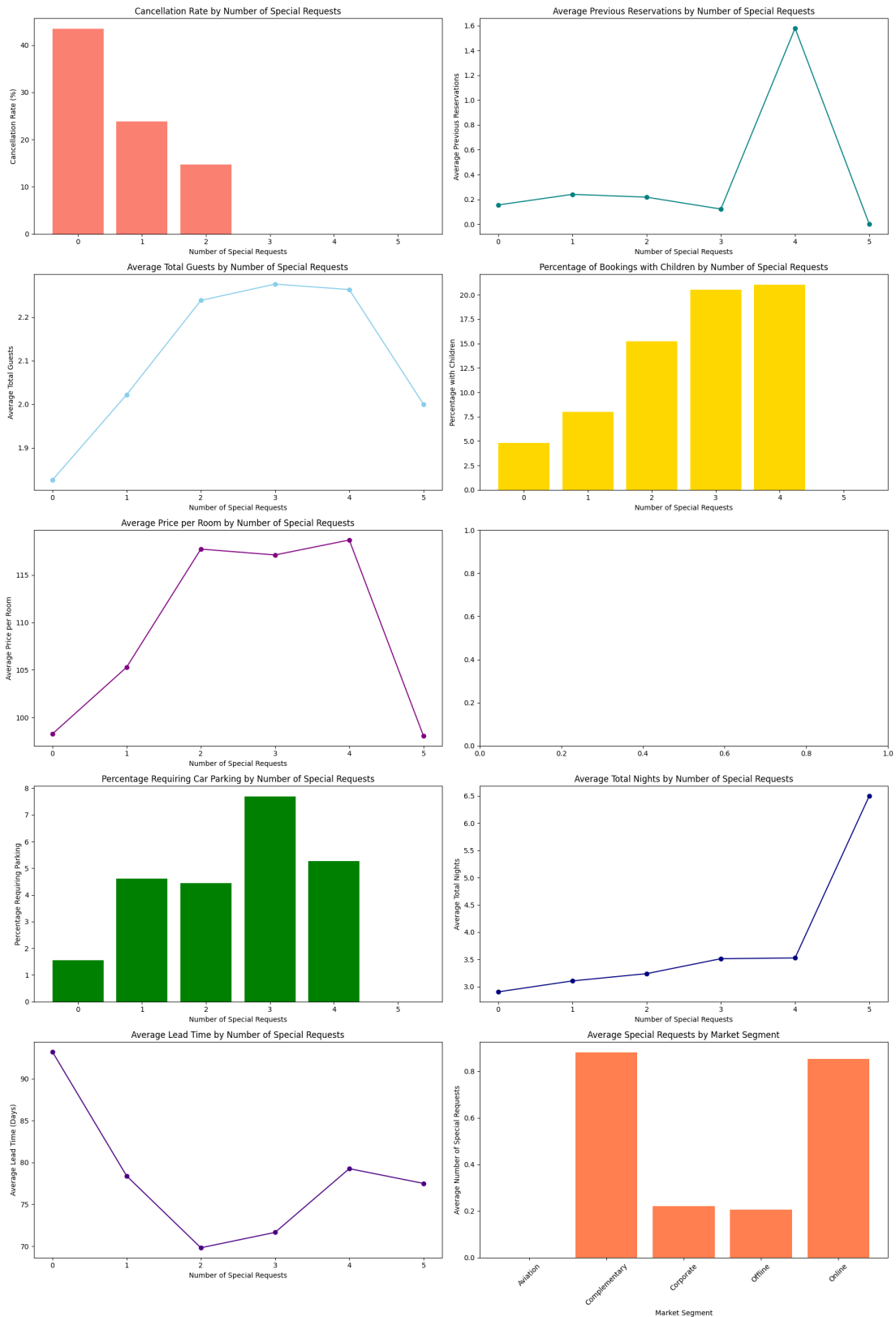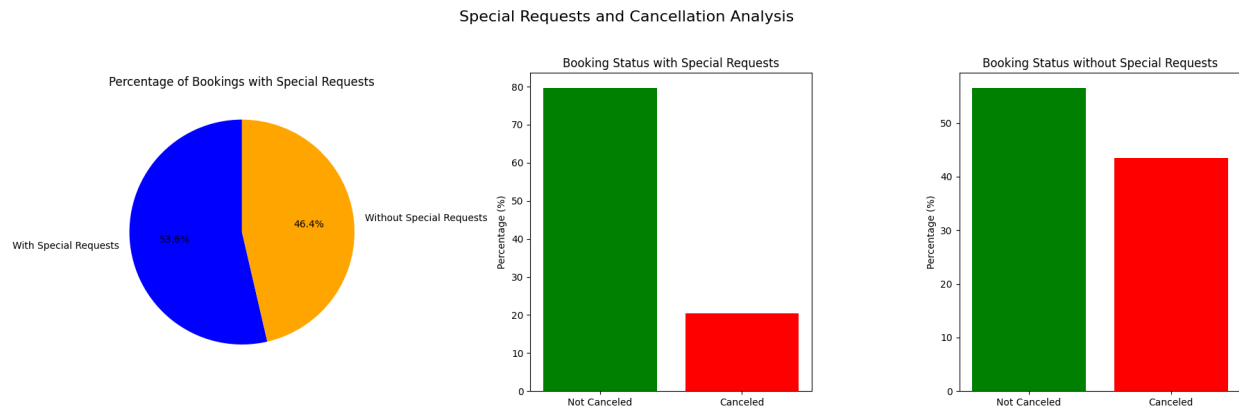
Section 3: Reservations Lead-Time

What insights can be gained from the lead time of canceled bookings, and how can we leverage this information to improve our booking system and enhance customer satisfaction?

Lead-Time Analysis Insights

- Higher Cancellation Rates with Longer Lead Times: There is a strong trend where cancellations increase as the lead time lengthens. Guests who book far in advance have a greater tendency to cancel.

- Longer lead times can signal less certainty in travel plans, as guests booking far ahead may not have finalized their schedules. These bookings may serve as placeholders until plans are confirmed or better options become available.

- Profile of Guests with Long Lead Times: Families and Groups: Families and larger groups often have longer lead times, reflecting the need to coordinate among multiple people. Although these guests tend to plan ahead, they may cancel if coordinating proves difficult.

- Seasonal Peaks: Certain months, such as summer and holiday seasons, see extended lead times as guests plan early to secure availability. These months also align with higher cancellations, likely due to the volume of early bookings.

- Longer Stays with Longer Lead Times: Bookings with extended stays, such as vacations, often involve longer lead times, as guests seek to secure preferred dates and accommodations.

- Higher Price Sensitivity: Guests booking closer to their stay dates often show higher price resilience, booking with urgency rather than price as a primary factor.

- Low Cancellations in Short Lead Times (Bottom 10%): Short-lead-time bookings, such as last-minute reservations, tend to have very low cancellation rates. These bookings are likely made by guests with confirmed plans, which are less prone to change.

- High Cancellations in Extremely Long Lead Times (Top 10%): Pattern: The highest cancellation rates are observed in the longest lead times (top 10%), where cancellations can reach as high as 100% in some cases.

Suggestions based on Lead Time Analysis

Note: Most of the suggestions mentioned before do apply, but will highlight the more relevant ones.

- Graduated Cancellation Policies: Implement a flexible cancellation policy that adjusts as the stay date approaches. For example, bookings with a lead time exceeding six months could be subject to a low cancellation fee initially, with the fee gradually increasing closer to the check-in date. This encourages guests to commit as their stay date approaches.

- Booking Modifications: Offer guests with long lead times the ability to modify their bookings, including date changes, without penalties. This flexibility can reduce outright cancellations while accommodating the changes that often arise in long-term travel planning.

- Regular Communication for Long Lead Time Bookings

- Last-Minute Deals: To fill unsold rooms close to the stay date, provide last-minute promotions. These can attract bookings with low cancellation risks, contributing to more reliable occupancy.

- Early-Bird Rates with Non-Cancelable Options: Encourage commitment from early-booking guests by offering non-cancelable rates at a discounted price.

This can attract guests who are certain about their travel dates, thereby reducing the likelihood of long-lead cancellations.

Cancellation Rate for Top and Bottom 10% of Lead Time
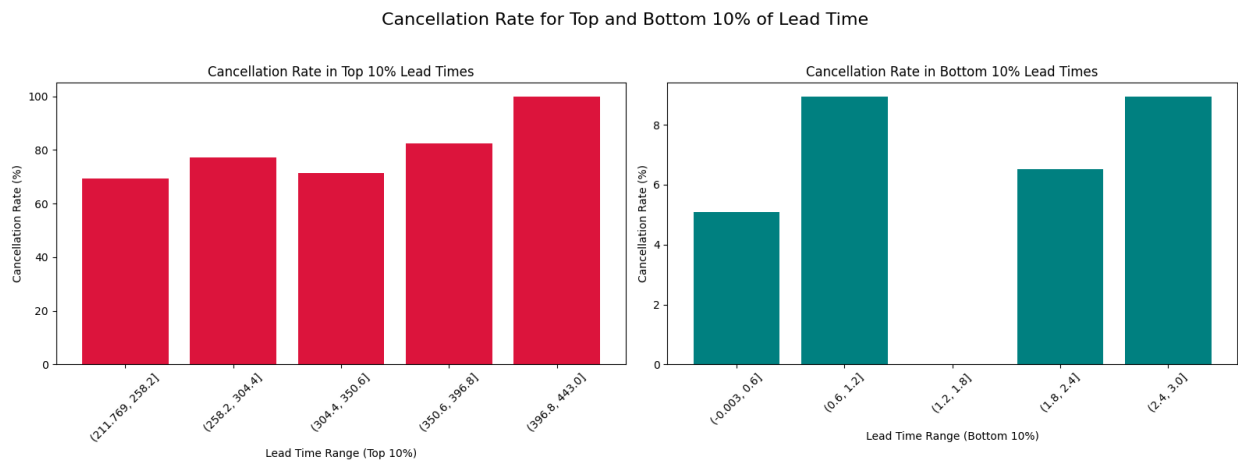
Lead Time Analysis and Related Metrics
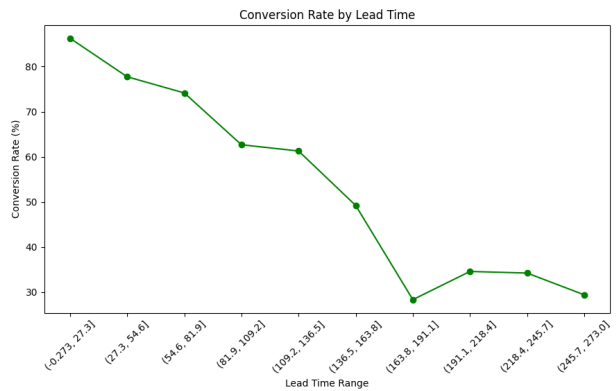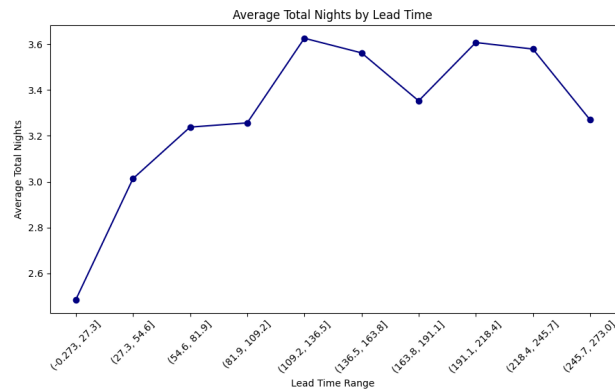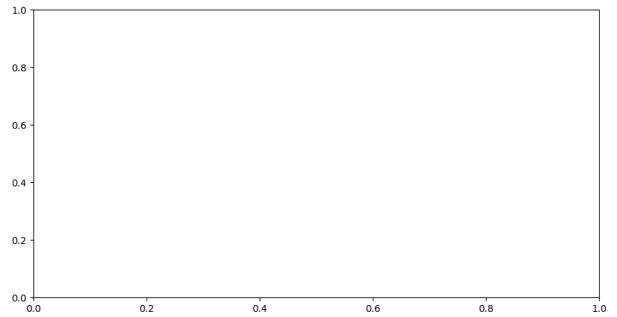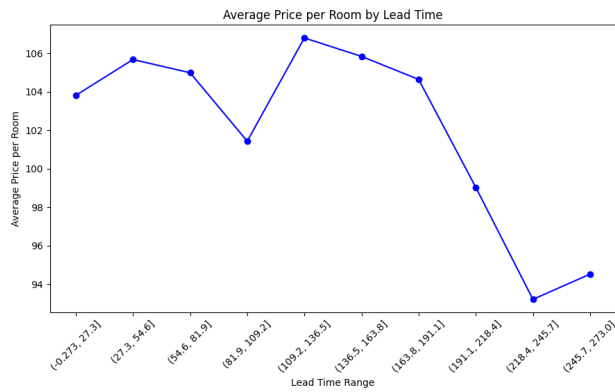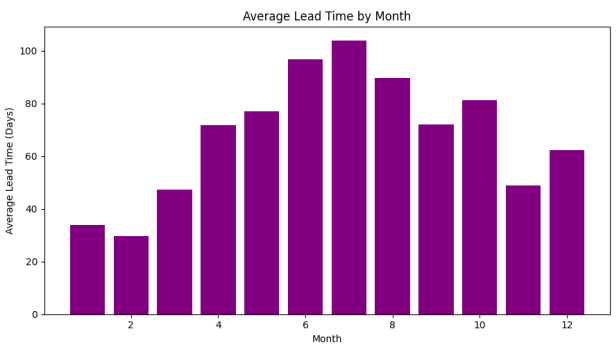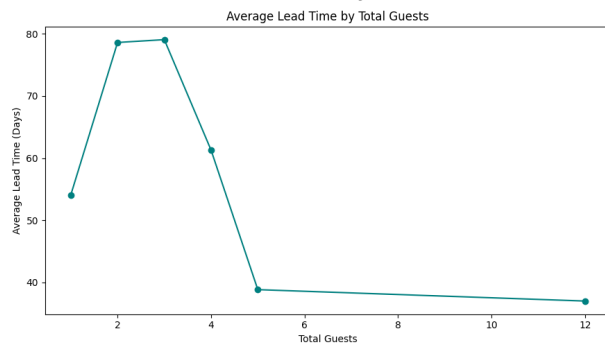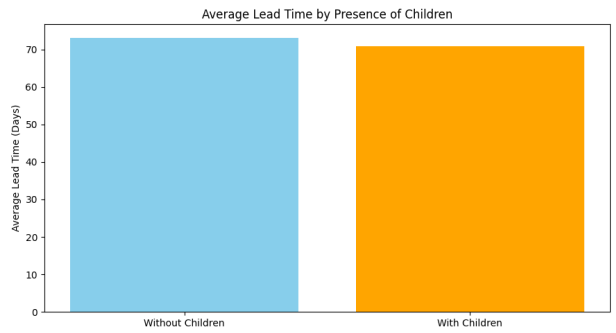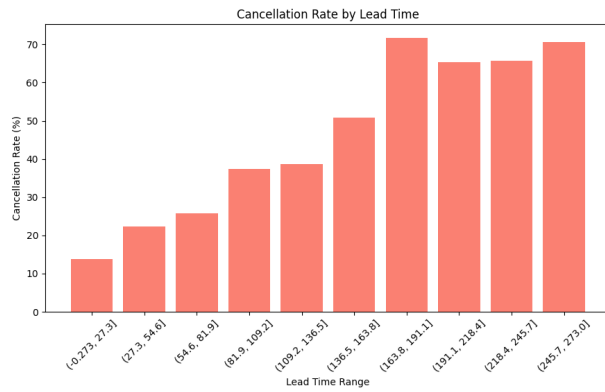
Section 4: Seasonality

Analyze the cancellation rate for each month and compare it to other months to determine any patterns or reasons for variation

Seasonality & Monthly Trends Analysis

- Peak Cancellation Period (Q3): The cancellation rate is highest between June and September, reaching a peak in July at approximately 45.6%. This period coincides with summer vacations and increased travel demand, which might prompt guests to secure bookings early and later adjust or cancel as plans solidify.

- Higher Booking Volumes and Cancellations in Q3: The data shows an increase in booking volume from June to September, which is also the period with the highest cancellations. This indicates that while demand surges during these months, so does the rate at which guests cancel or modify their bookings.

- Low Cancellation Period (Q4 and Q1): In contrast, cancellation rates are significantly lower in December and January, around 3-13%. These months represent the holiday season and the beginning of the year when travel tends to be more predictable, particularly for planned holidays or family gatherings.

- Longer Lead Times in High-Cancellation Months: Lead times are longest in summer months, as guests often book well in advance to secure accommodations for vacation. This extended lead time may contribute to higher cancellation rates, as plans may change over time.

- Higher Prices in Peak Cancellation Months: Average room prices peak during high-demand months, such as July and September, aligning with the increase in cancellations. This price increase might reflect the higher demand, but it could also lead some guests to cancel if alternative, more affordable options become available closer to their stay date.

- Pricing Stability in Low-Cancellation Months: In contrast, months like December and January see stable or slightly lower average prices, which may

reinforce commitment among guests, leading to fewer cancellations.

- Longer Stays in Summer and Holidays: The average total nights per booking peaks during summer months and in December, indicating that guests often plan extended stays during these high-demand periods. This could contribute to cancellations, as extended stays require more planning and commitment, which may be subject to change.

Potential Reasons for Cancellation Variety Between Months

- (June to September) the high cancellation rates in these months can be attributed to several factors, including longer lead times, higher prices, and the nature of summer travel plans, which are more prone to adjustments. The demand for special requests also peaks, reflecting a need for customization that, if unmet, could lead to cancellations.

- (December and January) These months see lower cancellation rates, likely because of more predictable holiday travel plans and shorter lead times, which increase booking commitment. Price stability and lower demand for special requests further reinforce this pattern.

- The higher room prices and higher cancellation rates in July and September indicate an opportunity to review pricing strategies to balance revenue maximization with booking retention. Adjusting prices or offering incentives to encourage non-cancelable bookings during these months could help stabilize occupancy.

Monthly Analysis of Key Metrics for Arrival Year 2018
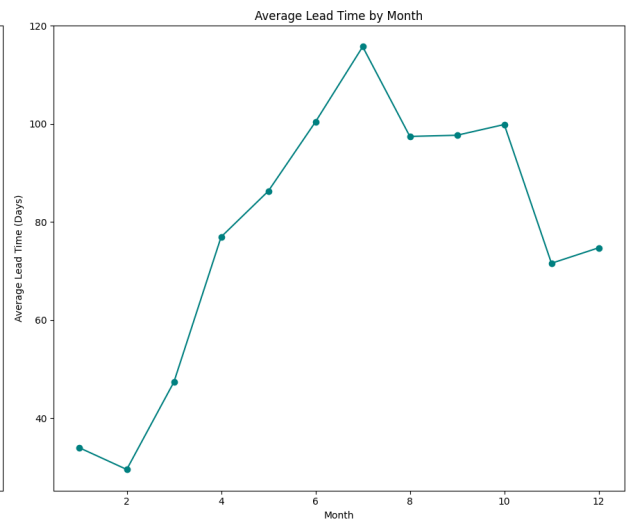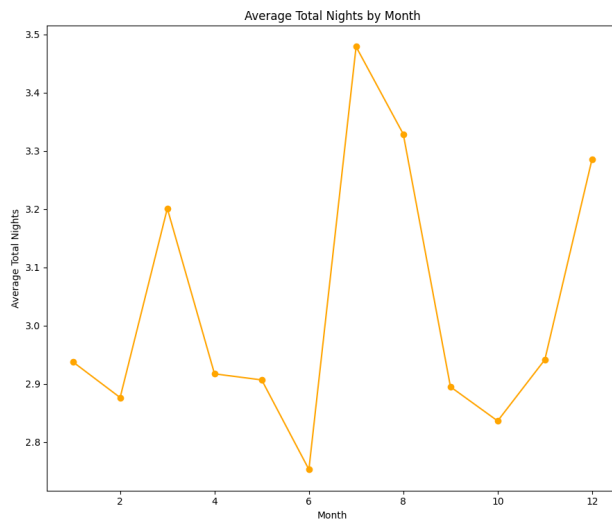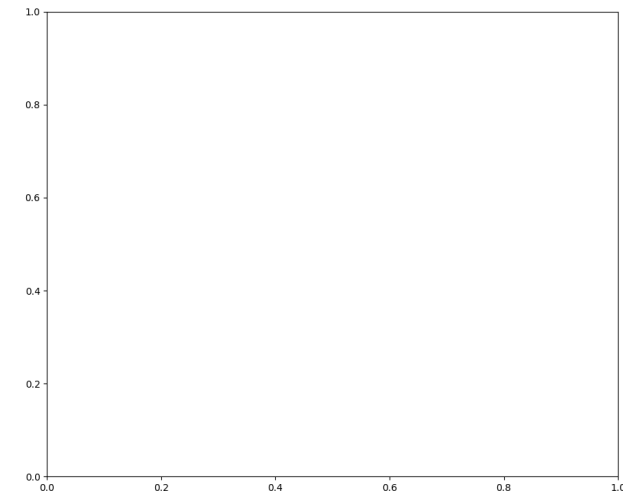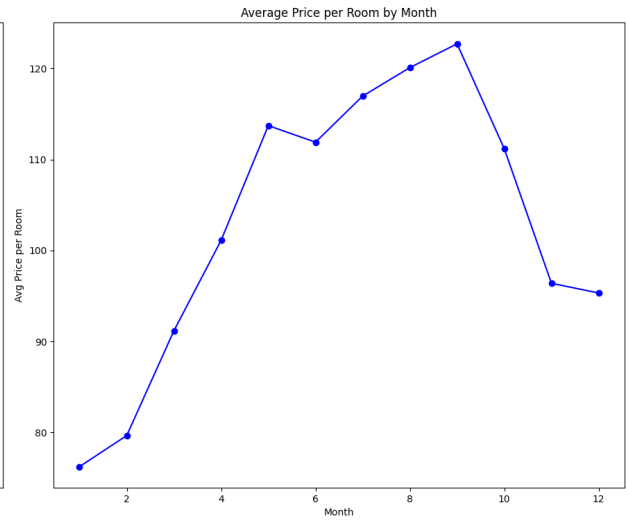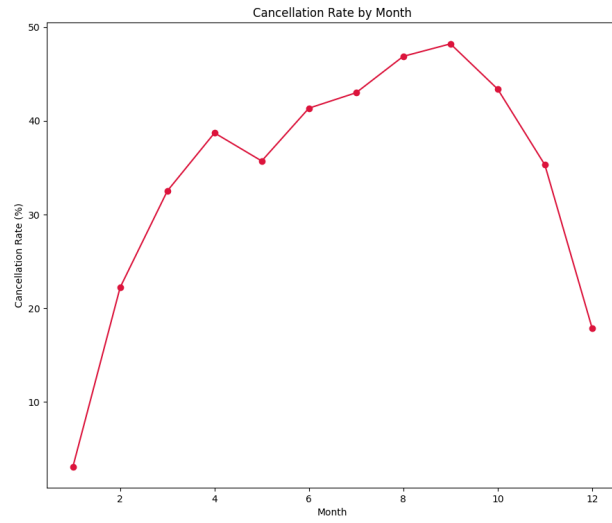
Analyses Summaries & Highlights

Increased Demand Management & Accommodation

Optimize Pricing and Booking Policies During High-Demand Periods

Note: Some of it is repetitive, but with more emphasis on handling increased demand.

Dynamic Pricing Based on Seasonal Trends

- Data indicates that peak prices and booking volumes align during high-demand months (June-September and December). To maximize revenue while maintaining competitiveness, implement a tiered dynamic pricing model that adjusts rates according to demand surges. For example, July shows a cancellation rate peak at 45.6%, suggesting that slight adjustments in pricing during this period could balance occupancy and prevent overbooking.

Flexible, Non-Cancelable Booking Incentives

- The high lead time for bookings in summer months leads to higher cancellations, especially in the top 10% lead-time range where rates reached up to 100%. To mitigate this, offer a non-cancelable discounted rate for guests who confirm early and commit to their bookings.

Implement Advanced Demand Forecasting to Optimize Inventory and Staffing

Monthly and Seasonal Booking Patterns:

- Insights indicate that Q3 and December are periods with heightened demand and increased booking lengths. By forecasting room occupancy based on previous booking data, especially by month, the hotel can optimize room

availability, manage special request fulfillment, and adjust staffing to match predicted occupancy.

- Monitor Lead Time and Cancellation Patterns to Adjust Overbooking Levels, by understanding lead-time patterns, set overbooking thresholds in months with a high probability of cancellations to ensure optimal occupancy even after last-minute changes.

Adapt Booking Structures Based on Group and Family Needs

- Families and groups often book with longer lead times and stay longer. Providing tailored packages that accommodate families (e.g., adjoining rooms, child amenities) and groups can increase retention and decrease cancellations. Because Bookings that include children have longer average lead times, indicating they plan further in advance and may value packages tailored to family needs

Flexible Capacity and Inventory Management

- Adjust Room Inventory and Staff Resources by Demand Forecasts: Prepare for high booking volumes in peak months (Q3 and December) by ensuring adequate room inventory and staff allocation. Optimize housekeeping, concierge, and maintenance schedules to match peak occupancy periods. Because monthly booking data shows Q3 and December as high-volume periods, requiring additional staffing and flexible inventory management.

- Prioritize Longer Stays During High-Demand Periods: Focus on guests booking longer stays in peak months by offering tailored packages. This approach reduces turnover and maximizes occupancy with fewer reservation changes. For peak months, set minimum stay requirements to ensure rooms are filled for extended periods, reducing the impact of high turnover.

Other Interesting data facts

Data Insights that weren't highlighted in the tasks above:

- The data is pretty much a preprocessed and cleaned dataset, and most likely is used for educational purposes.

- It is very interesting that there are 8 bookings on 29th of February in a none-leap year, Yet surprisingly, 6 of the trips weren't canceled. Which makes me wonder about the data quality and credibility.

- people who do not select a meal plan, generally spend more money on their rooms, which can give an interesting feedback about the customers' behavior.

- For room types: Room 1 is mainly for either single or couple reservations (the most booked room), while room 4 tend to be for more people.

- 7% of the data has children included in the reservations, and a very small portion has children only with no adults.

- Meal Plan 1 is the most dominant and most selected plan. And the percentage increases when having children, which gives us the safe assumption that it is the breakfast plan

- With Children: Bookings with children tend to have more weekend nights compared to those without children, suggesting that families might be leveraging weekend stays to reduce disruption during the school week or to make the most of shorter trips. (Very small)

- The average prices are higher when people book weekends only compared to week days only

- Link Between Parking and Longer, More Customized Stays: Bookings with a parking requirement are often longer stays with more special requests, suggesting that guests with a vehicle may anticipate more in-room amenities and are likely to plan for a more tailored stay.

- Higher Average Total Guests: Bookings with a parking request typically have a larger group size. This makes sense, as families or groups traveling together may need a car to accommodate everyone.

Concise EDA Summary

Market Segments

Online Bookings (64%)

- Highest revenue and cancellation rate (36%).

- Guests book in advance, spend more, prefer peak seasons and weekends.

Offline Bookings (30%)

- Lower prices and cancellation rates.

- Attracts last-minute, price-sensitive guests with short stays.

Corporate Bookings (5%)

- Longest stays planned well in advance.

- Provide stable, weekday occupancy with moderate cancellations.

Cancellation Insights

- Overall Rate: High at 32.8%, peaking in summer months (up to 45.6% in July).

Key Factors

- Longer lead times increase cancellation likelihood.

- Fewer special requests correlate with higher cancellations.

- Repeated guests cancel less (1.25% vs. 33.6% for new guests).

Strategies to Reduce Cancellations

- Predictive Engagement: Identify likely cancellations and proactively engage guests.

- Policy Adjustments: Implement stricter policies for long lead times.

- Incentivize Loyalty: Offer programs and perks to encourage repeat bookings.

- Target Stable Segments: Focus on corporate and offline guests with lower cancellation rates.

Customer Retention

- Low Return Rate: Only 2.6% are returning customers.

Improvement Strategies

- Develop loyalty programs for leisure and online guests.

- Enhance corporate partnerships.

- Create attractive packages for families and groups.

Revenue Optimization

- Losses: 35% of potential revenue lost to cancellations.

Action Points

- Enhance retention in the online segment.

- Improve experiences for guests with special requests.

- Adjust pricing dynamically, especially in low-performing months.

- Reward repeat guests to encourage loyalty.

Key Takeaways

- Reduce High Cancellation Rates: Focus on online bookings and long lead times.

- Enhance Customer Loyalty: Implement programs targeting leisure travelers.

- Optimize Revenue: Use dynamic pricing and personalized services.

- Data-Driven Decisions: Leverage insights on guest behavior to inform strategies.